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AUTHOR	Lance, Keith Curry; Rodney, Marcia J.; Hamilton-Pennell, Christine
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ABSTRACT

This study establishes the link between the presence of adequate school library staffing and higher academic achievement as indicated by PSSA (Pennsylvania System of School Assessment) reading scores. School library staffing is correlated with such scores; as library staffing rises, reading scores rise. This correlation is not explained away by other school conditions, such as per pupil expenditures by school or the teacher-pupil ration. Likewise, the relationship is not explained away by community conditions, such as poverty and low adult educational attainment. Several characteristics of school library programs beyond staffing help to explain the relationship between library staffing and academic achievement. These characteristics include: school library expenditures; information resources; information technology; and staff activities that help to integrate information literacy into the school's approaches to standards and curricula. This report contains 14 data tables and several statements by school librarians. (MES)

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Measuring Up to Standards

Findings

The Impact of School Library Programs & Information Literacy in Pennsylvania Schools

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Keith Curry Lance
Marcia J. Rodney
Christine Hamilton-Pennell

Pennsylvania Citizens for Better Libraries

Measuring Up to Standards

The Impact of School Library Programs & Information Literacy in Pennsylvania Schools

Keith Curry Lance
Marcia J. Rodney
Christine Hamilton-Pennell

Pennsylvania Citizens for Better Libraries
604 Hunt Club Drive
Greensburg, PA 15601

February 2000

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Findings

The first important achievement of this study is to establish that there is a link between the presence of adequate school library staffing and higher academic achievement (as indicated by PSSA reading scores). In fact, however, the relationship between library staffing and PSSA reading scores is stronger than that. School library staffing is correlated with such scores. As library staffing rises, reading scores rise. This correlation is not explained away by other school conditions, such as per pupil expenditures by schools or the teacher-pupil ratio. Likewise, the relationship is not explained away by community conditions, such as poverty and low adult educational attainment. Several characteristics of school library programs beyond staffing help to explain the relationship between library staffing and academic achievement. These characteristics include: school library expenditures, information resources, information technology, and staff activities that help to integrate information literacy into the school's approaches to standards and curricula. (See Figure 1, p. 9.)

Presence of Adequate School Library Staffing Linked to Higher PSSA Reading Scores

The success of any school library information program in promoting high academic achievement depends fundamentally on the presence of adequate staffing—specifically each library should have at least one, full-time, certified school librarian with at least one full-time aide or other support staff member. For all three tested grades, the relationship between such staffing and PSSA reading scores is both positive and statistically significant.

In 1998/99, three out of five Pennsylvania elementary schools with adequate school library staffing (61 percent) reported average or above reading scores, while the same proportion of such schools with inadequate library staffing reported below average scores. (See Table 2.)

Table 2. Fifth Grade PSSA Reading Scores by Presence or Absence of School Librarian with Support Staff, 1998/99

Library Information Librarian with Support Staff	5th Grade PSSA Reading Scores					
	Average or Above		Below average		Total	
Present	62	60.8%	40	39.2%	102	100.0%
Absent	14	38.9%	22	61.1%	36	100.0%
Total	76	55.1%	62	44.9%	138	100.0%

Chi-square = 5.156, $p < .05$

The same year, two out of three middle schools with adequate school library staffing (66 percent) reported average or above reading scores, while three out of five such schools with inadequate staffing (59 percent) reported below average scores. (See Table 3.)

Table 3. Eighth Grade PSSA Reading Scores by Presence or Absence of School Librarian with Support Staff, 1998/99

School Librarian with Support Staff	8th Grade PSSA Reading Scores					
	Average or Above		Below average		Total	
Present	79	66.4%	40	33.6%	119	100.0%
Absent	26	40.6%	38	59.4%	64	100.0%
Total	105	57.4%	78	42.6%	183	100.0%

Chi-square = 5.156, $p < .001$

The same year, almost three out of five high schools with adequate school library staffing (57 percent) reported average or above reading scores, while three out of five such schools with inadequate library staffing (59 percent) reported below average scores. (See Table 4.)

Table 4. Eleventh Grade PSSA Reading Scores by Presence or Absence of School Librarian with Support Staff, 1998/99

School Librarian with Support Staff	11th Grade PSSA Reading Scores					
	Average or Above		Below average		Total	
Present	78	57.4%	58	42.6%	136	100.0%
Absent	27	41.5%	38	58.5%	65	100.0%
Total	105	52.2%	96	47.8%	201	100.0%

Chi-square = 4.409, $p < .05$

The findings of this analysis are consistent across all three tested grades. Students are more likely to earn above average test scores in schools with adequately staffed school library programs.

PSSA Reading Scores Increase as School Library Staffing Increases

Further analysis indicates that the relationship between school library staffing and academic achievement is even stronger than it appeared when simply dividing schools between those with more and fewer library staff and higher and lower test scores. The relationship between library staffing and student performance is incremental: as school library staffing increases, reading scores increase.

Two or More Heads are Better

Rebecca Casiano is the Supportive Service Assistant at Roberto Clemente Middle School in Philadelphia, PA. Her work is vital to the success of the school library media program with our predominantly Hispanic student body. Ms. Casiano is fluent and literate in both English and Spanish. Because she lives close to the school, she knows many of the students and their families from the neighborhood.

Our students are not readers. With Ms. Casiano's help, we run thematic English and Spanish literacy-based contests which are very popular with our students. She is a vital link to our Spanish speaking parents. Ms. Casiano's involvement has caused our circulation to double and then triple, to well over 1,000 books a month, increased use of our computer services by two-fold, and guided development of our Spanish language collection.

We have had to hire an additional clerk due to demand. Ms. Casiano is now a college student, majoring in Information Technology to be followed by a master's degree in Library Science. We are proud of her accomplishments and very pleased to have her assistance.

Carol Heinsdorf, Librarian
Roberto Clemente Middle School
Philadelphia

Simple correlation does not equal cause, but the evidence for a causal relationship mounts as the other factors that might explain away the relationship are ruled out. Comparing the bivariate correlation coefficients for library staffing and reading scores with partial correlation results controlling for potentially influential outside factors (i.e., other school and community conditions) reveals that none of these other factors explains away that relationship. There is a consistently positive and highly statistically significant relationship between library staffing and academic achievement. Indeed, when some other factors are controlled, the relationship between staffing and student performance is even stronger.

When the relationship between library staffing and test scores is controlled for differences in school size, spending, teacher-pupil ratio, and teachers' education and experience, the relationship is neither weakened nor strengthened dramatically. Only one teacher characteristic—average salary—weakens the relationship between library staffing and test scores across all tested grades. Notably, this salary average includes the salaries of certified school librarians. (See Table 5 .)

Table 5. School Library Staffing as Predictor of PSSA Reading Scores Controlling for Selected School Conditions, 1998/99

Control variable	Correlation between Librarian/support staff & PSSA reading scores		
	5th Grade	8th Grade	11th Grade
None (bivariate correlation)	.215 *	.252 *	.274 *
Partial Correlations			
Enrollment (i.e., school size)	.215 **	.196 **	.258 **
Per pupil expenditures	.286 **	.190 **	.252 **
Teacher-pupil ratio	.197 *	.264 **	.269 **
Teacher characteristics			
Percent of teachers with master's degrees	.191 **†	.206 **	.245 **
Teacher's average years of experience	.241 **†	.244 *	.280 **
Average teacher salary	.147 *†	.123 *†	.158 *

*Correlation is significant at the 0.05 level
** Correlation is significant at the 0.01 level
†Correlation is one-tailed

When the relationship between school library staffing and test scores is controlled for socio-economic differences, the relationship reveals itself to be a dynamic one in several ways. (See Table 6.)

When the relationship between school library staffing and achievement is controlled for differences in adult educational attainment, the relationship is weakened for all three tested grades. The relationship is weaker still, however, at the high school level compared to the elementary and middle school levels. This finding suggests that school library programs can compensate better for a lack of parental education before rather than after students reach the mid to late teens. This finding highlights the importance of school libraries with professional staffing in elementary schools.

When the relationship between school library staffing and achievement is controlled for the race/ethnicity of students, it is weakened slightly at elementary level and remains little changed at middle school level, but increases dramatically at high school level. This finding suggests that, while school library programs are challenged to compensate for the cultural disadvantages of many minority children in the early years of public education, those programs are more successful at compensating for such disadvantages as students mature.

A Little Help Goes a L-o-o-o-ng Way

I have a full day of classes. The last class just reminded me of why we need more clerical staff. I did a 10 minute lesson and let the kids loose on Pearl Harbor, Hiroshima, and Manzanar. While I worked with the kids, my aide ran around the whole period dealing with rebooting computers that lost network connection, print problems, and assisted kids in logging on. I have a volunteer checking in books and a student aide doing a bulletin board. So we need additional staff just to address technology tasks and problems.

An additional part-time aide enables us to process material in a more timely manner. Because research skills instruction and planning with teachers are priorities, the processing backlogged. So more clerical time allows me more time for instruction, planning projects with teachers, and time for PR such as displays, bulletin boards, supervision of library aides, and volunteers.

One of our elementary libraries was without an aide. Our middle school library aide was given another duty part of the school day and was not available during a very busy part of the day. We wrote a proposal outlining the current state of affairs and what could be accomplished by adding clerical help. One of our best volunteers was hired in that capacity.

Nancy Smith, Librarian
Susquehanna Township High School

Predictably, economic differences (e.g., median family income, percent of families living in poverty) have the most consistently undermining effect on the relationship between school library staffing and reading scores. It is difficult for the best school library program to foster students' learning when their home life is defined by the privations of poverty. Children from poorer families are less likely to live in homes where books and other information sources are readily at hand, and where a home computer providing access to the World Wide Web can be taken for granted. Nonetheless, even when economic differences are ruled out, the relationship between school library staffing and test scores remains both positive and statistically significant.

Table 6. School Library Staffing as Predictor of PSSA Reading Scores Controlling for Selected Community Conditions, 1998/99

Control variable	Partial correlation between Librarian/support staff & PSSA reading scores		
	5th Grade	8th Grade	11th Grade
None (bivariate correlation)	.215 *	.252 *	.274 *
Partial Correlations			
Percent of adults graduated from high school	.194 *	.191 **	.129 *†
Percent of students from racial/ethnic minority groups	.177 †	.291 **	.381 **
Socio-economic conditions			
Median family income	.146 †		
Percent of families in poverty		.133 *†	.185 **

*Correlation is significant at the 0.05 level
** Correlation is significant at the 0.01 level
†Correlation is one-tailed
Note: Shaded cells indicate the absence of a positive, statistically significant relationship of .100 or greater. The absence of statistical significance is frequently attributable to an inadequate number of reporting cases on the variable in question.

While controlling for some school and community conditions (e.g., average teacher's salary, community socio-economic conditions) weakens the relationship between school library staffing and achievement, more often there is little change, and, in one case (e.g., race/ethnicity), the relationship is even strengthened over time.

Because none of these other factors explains away the relationship between school library staffing and achievement, that relationship is likely to be one of cause-and-effect. This analysis revealed no evidence to support claims that the relationship is explained by an antecedent variable (i.e., something else that causes both library staffing and achievement). Whether there might be intervening factors—ones attributable to school library staffing that promote achievement—is another issue.

School Library Staffing Linked to Library Expenditures, Information Resources and Technology, and Integrating Information Literacy

Given that there is a positive, statistically significant relationship between school library staffing and achievement—by all indications, a cause-and-effect relationship—the obvious next question is "How does such staffing result in higher PSSA reading test scores?"

At all three school levels, school library staffing is correlated consistently with the level of school library expenditures and the number and variety of available information resources (e.g., books, periodicals, databases). For grades 5, 8, and 11, as weekly hours of school librarians—alone and in combination with support staff hours—increase, both expenditures on school library programs and the size of their collections increase. (See Table 7.)

Helping Hand Gives Machines a Boost

Hands-on instruction works the best. When students need help with a CD-ROM or the Internet, I stand alongside them and suggest search terms or tell them step by step about individual components of a web page. This year, I have six working computers and a printer. So it is much easier for the kids to get what they need.

I encourage use of different Web sites at this early stage of research because the Internet is so vast and I think it is more important to discover it. Also, when a student needs several Internet resources, they can compare different writings and angles. I believe the students should have as much experience as possible using all resources to discover the differences in all of them.

I am on the Internet a lot of the time reading newsletters and investigating new sites, so I know where to find much of the information the kids need. I've even developed a Web site that teachers use for their classes.

Karen Huber
Indian Valley High School
Lewistown

At all three school levels, school library staffing also demonstrated a consistently positive and statistically significant relationship to a combination of library staff activities related to integrating information literacy into the school's approach to standards and curricula. These staff activities, particularly those of the school librarians, include teaching cooperatively with teachers, providing in-service training to teachers, meeting with standards and curriculum committees, providing information skills instruction to groups or individuals, and managing information technology. As school library staffing increases, the typical weekly hours spent on this combination of activities also increases. (See Table 7.)

At both elementary and secondary levels, increases in library staffing are also linked to increased access to computer resources. Notably, computers counted in this study are those either in or under the jurisdiction of the school library program as well as any computer elsewhere in the school—in classrooms, computer labs, studios, or offices—that have networked access to library resources. (See Table 7.)

An interesting distinction in these findings between elementary and secondary levels is that, for both levels, as library staffing increases, computers with access to licensed databases increase, while, for secondary level alone, staffing increases are linked with increases in computers with Internet/World Wide Web access. These findings probably reflect the increasing time and money commitments of most librarians to licensing and promoting use of well-organized, up-to-date, high-quality databases as well as the active concern of some public officials and interest groups about very young children having completely open access to the Web.

Table 7. School Library Staffing as Predictor of Other Characteristics of Pennsylvania School Library Programs, 1998/99

Correlation of school librarian—alone & with support staff	5th Grade		8th Grade		11th Grade	
	Librarian Alone	Librarian w/support staff	Librarian Alone	Librarian w/support staff	Librarian Alone	Librarian w/support staff
School Library expenditures	.300 **	.220 *	.197 **	.427 **	.329 **	.439 **
Information resources						
Print volumes	.338 **	.286 **	.275 **	.541 **	.360 **	.404 **
Periodical subscriptions	.195 *	.185 *	.133 *†	.280 **	.177 *	.275 **
CD-ROM reference titles (combined with print)	.372 **	.292 **	.294 **	.539 **	.408 **	.488 **
Information technology						
Library & networked computers	.373 **	.298 **			.169 *	.154 *
with access to library databases	.263 **	.277 **	.174 *†		.267 **	.151 *†
with Internet access				.174 *†		.183 *
Integrating information literacy+	.433 **		.363 **	.306**	.399 **	.350 **

+Combined weekly hours spent teaching cooperatively with teachers, providing in-service training to teachers, meeting with standards and curriculum committees, providing information skills instruction to groups or individuals, and managing information technology

*Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

†Correlation is one-tailed

Note: Shaded cells indicate the absence of a positive, statistically significant relationship of .100 or greater. The absence of statistical significance is frequently attributable to an inadequate number of reporting cases on the variable in question.

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School Library Expenditures Linked to Information Resources

In Pennsylvania, as throughout the nation, most school library program budgets include funds for information resources, supplies, and other operating costs specific to the library program. Generally, these budgets do not include the funds that cover the salaries and benefits of staff. Thus, it is little surprise that library expenditures correlate positively, strongly, and statistically significantly with the size of the library program's collection of traditional print information resources, specifically print volumes and periodical subscriptions.

Table 8. School Library Expenditures as Predictor of Pennsylvania School Library Information Resources, 1998/99

Correlation of school library expenditures	5th Grade	8th Grade	11th Grade
Information resources			
Print volumes	.341 **	.425 **	.372 **
Periodical subscriptions	.434 **	.379 **	.277 **

** Correlation is significant at the 0.001 level

Plant a Dollar, Reap a Harvest

My library budget was increased from $10,000 in 1997-98 to $20,000 in 1998-99. I was able to weed out practically the entire 900 section, re-supply the out-dated history and geography books, and renew the 300 section of the collection, as well as purchase a security system to protect against loss of these valuable new materials. Faculty response has been terrific! With this improved collection, I am better able to convince my students and faculty to use books FIRST, before resorting to the Internet for fast, reliable information for their projects.

Mary Jane Zimmerman, Demonstration Librarian
William Penn High School
Philadelphia

Information Resources Linked to Integrating Information Literacy

The mere presence of a large collection of books, magazines, and newspapers in the school library is not enough to generate high levels of academic achievement by students. Such collections only make a positive difference when they are part of school-wide initiatives to integrate information literacy into the school's approach to standards and curricula. Rich collections of information resources can only help to improve the learning environment if the school librarian is in a position to mobilize them to that end. As the correlation coefficients reported in Table 9 indicate, the relationship between having access to such resources and having school librarians who are actively engaged in enriching the learning environment is important at all grade levels, but is especially important at the elementary level.

Table 9. Information Resources as Predictors of Integrating Information Literacy in Pennsylvania Schools, 1998/99

Correlation of integrating information literacy	5th Grade	8th Grade	11th Grade
Information resources predictors			
Print volumes	.359 **	.247 **	.242 **
Periodical subscriptions	.341 **		
CD-ROM reference titles	.222 *		
Information resources combined	.324 **	.252 **	.284 **

+Combined weekly hours spent teaching cooperatively with teachers, providing in-service training to teachers, meeting with standards and curriculum committees, providing information skills instruction to groups or individuals, and managing information technology

*Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

Note: Shaded cells indicate the absence of a positive, statistically significant relationship of .100 or greater. The absence of statistical significance is frequently attributable to an inadequate number of reporting cases on the variable in question.

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Books and Bucks

When I came to my district, library collections were pretty poorly funded. Those in control of the money didn't know what an impact good libraries with good collections and good librarians can have. In 1989, my first year here, my book budget was about $1,200. This year it was about $19,000, and that's for a library serving about 500 kids!

The specific collection development idea I wanted to mention is our Parenting Collection. I initially received $400 in grant money to fund the purchase of books on topics that parents were about. Numerous parents have remarked about what a great idea it is and how the titles that were chosen were very helpful. I promote this collection (and our collection as a whole) every chance I get. One parent mentioned how her son was diagnosed with ADHD and she found the books very helpful as she didn't know much about it or what to do to help her son with school work.

We now have such collections in two of our three elementary libraries. Parents may check them out at any time. I also set up a table display in the hall during parent/teacher conferences, the evening of our Education Fair (which highlights student work) and at other times when appropriate, such as PTO meetings. We have expanded to include videotapes and cassette tapes as well. I believe that this collection is an example of reaching out to the school community to promote what we can do!

Karen L. Fleeger
Sara Lindemuth Primary School
Harrisburg

A Dirty Book Story

Students routinely bypassed the books in our fiction section. Books were dirty and old, and very worn. Both high school and middle school students are served by our library, but high schoolers seldom took the fiction books out, or browsed them. New students would come to me excited about new books they wanted to read, but I could only direct them to our ACCESS PENNSYLVANIA Database interlibrary loan system.

Four years ago, the Library Power program and a grant from principal Barbara Bravo brought an infusion of funds. We started weeding our collection of books and reference works. With our new approach to reading and literature, we have spent money and time creating a literary room out of half our library space. There are large pillows and a window seat for kids to curl up and read for fun. We brought both literature and folklore into the room. Collections such as the Bernard Evslin Monsters of Mythology series, the Library of America series, and lots of paperback series books have tempted many more students to read for fun.

Now when we open before school in the mornings, there are students seated in the literary room, poring over leisure reading books. They've even asked if I would set up a cappucino bar, so that we can be a full service library!

Paul Scaer
J.R. Masterman School
Philadelphia

Cleaning Up for the Next Century

Five years ago there was grumbling about the age of the books in our 11 elementary school libraries. With the support of Dr. Jean Dyszel, our Assistant Superintendent, we prepared a collection development plan resulting in additional funds, over $120,000, to purchase new library books.

How did we do this? First we held a collection development workshop with Debra Kachel, librarian at Ephrata High School and nationally known consultant and author. All district librarians assisted in the library collection assessments. Then we compiled statistics on the collections' ages. Librarians identified specific areas and numbers of books needed to upgrade each library. With graphs, charts, and a five-year plan, Dr. Dyszel presented the libraries' needs to the administration and board of education. They granted all the requested money.

Now, after extensive weeding and adding hundreds of new books, our students have access to collections, designed to meet the research and leisure reading needs for the 21st century. The students, librarians and teachers love the new books!

Jean H. Tuzinski
Library Department Chair
West Shore School District
New Cumberland

Information Technology Linked to Integrating Information Literacy

The successful integration of information literacy into a school's approaches to standards and curricula depends on more than traditional library resources alone. In today's global information-based economy, information technology plays as important a role in promoting students' academic achievement as it does their later financial success. At both elementary and secondary levels, activities involved in integrating information literacy happen more often where school library programs have carefully developed, well organized, widely deployed computer networks.

The successful integration of information literacy in a school depends, in part, on the school library program managing a computer network that provides access to the library's catalog, ACCESS PENNSYLVANIA database, other licensed databases, and the Internet/World Wide Web. Such networks are not limited to computers in or under the jurisdiction of the school library program, but can—and should—include networked computers throughout the school, so that students and teachers can access needed information in classrooms, labs, studios, and offices.

Table 10. Information Technology Predictors of Integrating Information Literacy in Pennsylvania Schools, 1998/99

Correlation of integrating information literacy+	5th Grade	8th Grade	11th Grade
Information technology predictors			
Library/networked computers	.251		.173
with access to library's licensed databases	.408 **		.269 **
with Internet access	.249		.169
with ACCESS PA bookmark or menu item		.142 *†	.206

+Combined weekly hours spent teaching cooperatively with teachers, providing in-service training to teachers, meeting with standards and curriculum committees, providing information skills instruction to groups or individuals, and managing information technology

*Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

†Correlation is one-tailed

Note: Shaded cells indicate the absence of a positive, statistically significant relationship of .100 or greater. The absence of statistical significance is frequently attributable to an inadequate number of reporting cases on the variable in question.

Just another day in a plugged-in high school library...

A high school freshman enters the school library with his book-bag and his laptop. He chooses a study carrel, plugs in the laptop and begins his homework. First he logs on to the campus network and opens his personal e-mail account to check for further assignments or messages from his teachers. He opens Microsoft Word and saves a biology assignment in a document. Then he opens the online school "card catalog" and searches for books on taxonomy for his biology assignment. He goes to the shelves, and with the help of a librarian, chooses an appropriate book. Going back to his study carrel, he locates information in the book about the plants assigned to him and then opens Microsoft Word and begins taking notes on his screen.

After about 10 minutes of notetaking, he clicks on Netscape and enters the Internet world. He opens the science site recommended to him by his teacher in the e-mail message and views The Science Learning Network. As he identifies additional characteristics of his assigned plants, he adds the information to his notes in Word.

Near the end of his class period, he opens his Netscape Bookmarks and opens a Wall Street site to check a stock that he has been tracking daily for his Economics class. These activities are not the exception but the rule in the library at the Kiski School.

Diana G. Murphy, Head Librarian
The Kiski School
Saltsburg

Staffing + Technology = Integration

In September of 1998, Centerville Middle School received a blind seventh grader. Providing library services and accessibility to resources in the library was a priority. After receiving technology money from Link-to-Learn and the school district's technology budget, our school library was able to purchase a Windows NT station that could handle special equipment for this student. By using screen reading software, a scanner with speech access software, an external speech synthesizer, a Braille embosser, and a sighted person as a reader, we are able to provide all materials to our blind student that other students are able to access .

We are able to provide this, not only because of the equipment, but also because the school library employs a part-time secretary/aide. The aide acts as a reader when the student uses printed texts in the library, helps scan material and then edits the material so that the student can then listen to the information and take notes in the library. Information can also be sent to a Braille embosser so that the student may take the information home. The student is also learning how to use the screen reading software so that he will independently be able to use the library databases such as the card catalog, magazine indexes, electronic encyclopedias and the Internet.

Cathi Fuhrman, Library Dept. Chair
Centerville Middle School Library
Lancaster

PSSA Reading Scores Linked Directly to School Library Staffing, Information Technology and Integrating Information Literacy

Three sets of factors are directly related to the academic achievement of students: library staffing, information technology, and integrating information literacy. (See Table 11.)

Part of a Curriculum Team

In my school the librarian is an integral part of the High School Steering Committee, which is made up of five Area Coordinators and other school leaders, such as the Technology Director. We meet monthly and together we make decisions about many building-wide policies, most importantly, future curriculum directions.

We review all curriculum proposals and decide which course changes and initiatives will be presented to the board. Not only do I get to provide input from my vantage point of viewing the school's curriculum as a whole, but I also get to know in advance which content areas to emphasize in collection development.

Allison Hutchison, Librarian
Bald Eagle Area High School
Wingate

As the correlation coefficients reported in Table 11 indicate, the value of school library staffing as a predictor of test scores increases steadily by grade level. When most children enter school, their performance is influenced powerfully by their home environments. There is no denying those conditions remain important throughout students' school careers. However, the more time teachers and school librarians have to influence students, the greater the opportunity for a positive impact.

While access to information technology is an important predictor of test scores at both elementary and secondary levels, it varies meaningfully between levels. At the elementary level, test scores correlate with the mere presence of computers and with the access they provide to licensed databases. At the high school level, scores are predicted by the availability to students of computers with access to the Internet/World Wide Web. (The lack of such correlations at the middle school level is considered an anomaly and is attributed to the relatively small number of cases for eighth grade compared to grades five and eleven.)

In addition to school library staffing levels, the constellation of staff activities that help to integrate information literacy in the school is a consistent predictor of test scores for all tested grades. From elementary to secondary level, this relationship becomes both stronger and more statistically significant.

Table 11. School Library Program Predictors of PSSA Reading Scores, 1998/99

Correlation of PSSA + reading test scores	5th Grade	8th Grade	11th Grade
School librarian with support staff	.215 *	.252 *	.274 *
Information technology			
Library/networked computers	.229 *		
with licensed database access	.283 **		
with Internet access			.132 *†
Integrating information literacy ++	.148 *†	.133 *†	.185 **

+Pennsylvania System of Student Assessment (PSSA)
++Combined weekly hours spent teaching cooperatively with teachers, providing in-service training to teachers, meeting with standards and curriculum committees, providing information skills instruction to groups or individuals, and managing information technology
*Correlation is significant at the 0.05 level
** Correlation is significant at the 0.01 level
†Correlation is one-tailed
Note: Shaded cells indicate the absence of a positive, statistically significant relationship of .100 or greater. The absence of statistical significance is frequently attributable to an inadequate number of reporting cases on the variable in question.

Team Teaching Good Judgement

I have put together a lesson with our 10th grade speech teacher concerning the authority and validity of Internet sites. I have worked up a handout concerning the interpretation of domain names. This includes a copy of "Authority and validity checklist for Internet Sites" from the summer 1997 issue of *Learning & Media* on the reverse of this handout. After distributing and going over the handout, the teacher and I use an overhead display of various Web site addresses to reinforce the lesson and promote class discussion and participation. We project several different sites with our LCD projector and show the students where credits and colophons for different sites can be found and how they can be used to authenticate a site. This lesson will be used when the teacher discusses the importance of using credible sources when doing research for informative speeches and debates.

Peggy Mourer
Seneca Valley Intermediate High School
Harmony

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How Highest and Lowest Scoring Schools Compare on School Library Predictors of Academic Achievement

When PSSA reading scores are converted to the familiar 100 point scale, the differences between the highest and lowest scoring schools are apparent for all three tested grades. Likewise, the differences between their school library programs are dramatic. (See Tables 12, 13, and 14.)

PSSA Reading Scores

Students at the highest scoring schools averaged reading scores in the upper 80's, while their counterparts at the lowest scoring schools averaged scores in the mid-70's. For fifth and eleventh graders, the average scoring difference was 10 points, and, for eighth graders, 15 points.

School Library Expenditures

Higher achieving schools often spend twice as much—or more—on their school library programs as lower achieving schools. At the elementary level, annual school library spending average over $14,000 and just over $7,000, respectively, for higher and lower achieving schools. At the high school level, higher scoring schools spend about $22,000, while lower scoring schools spend less than $10,000. Such differences in buying power have been demonstrated to have a direct effect on the size of the school library program's collection of information resources.

School Library Staffing

While school librarians are common among the schools participating in this study, the level of such staffing varies. The level of certified school librarian staffing varies as much as six hours per week in middle schools. Differences in the level of support staffing are even more dramatic. At elementary and middle schools, higher achieving schools have 25 to 35 hours per week, respectively, of support staff, while lower achieving schools average half as much help, if any at all. When support staff is limited or non-existent, school librarians are not free to manage library expenditures, resources, and technology or to engage in key activities that ensure the integration of information literacy into a school's approaches to standards and curricula.

School Library Resources

The numbers of print volumes, periodical subscriptions, and CD-ROM reference titles available via school library programs at higher and lower achieving schools also vary substantially. While the collection at a typical lower achieving elementary school is only about 9,000 items, its counterpart at a higher achieving school exceeds 12,000—a difference of almost one-third. This gap closes somewhat for middle and high schools, but higher achieving schools still tend to have six or seven items in their collections for every five items found in lower achieving schools.

Information Technology

The most dramatic statistical difference between lower and higher achieving schools is in the area of information technology. The typical higher achieving elementary school has 40 to 50 computers either in or networked to the school library, while lower achieving schools average only 6 to 10. At the high school level, higher achieving schools average 75 to 100 computers compared with 20-25 for lower achieving schools.

Integrating Information Literacy

Finally, higher and lower scoring elementary schools are distinguished by the amount of time school library staff spend in teaching students and teachers how to access and use print and electronic information resources. At higher achieving schools library staff spend three days on such activities for every two by lower achieving schools. Small investments of time in key activities pay off. At higher achieving schools at all grade levels, library staff are involved in committees and provide in-service training to teachers. Library staff at lower achieving schools usually do not engage in these activities at all.

Table 12. Comparison of Highest and Lowest Scoring Schools on Key School Library Predictors of 5th Grade PSSA Reading Scores, 1998/99

5th Grade PSSA Reading Scores & Predictors	25 Highest Scoring Schools		25 Lowest Scoring Schools		Percent Difference (lowest to highest)	
	Mean	Median	Mean	Median	Mean	Median
PSSA Reading Scores (100 point scale)	90.02	89.38	76.40	78.75	18%	13%
Library Expenditures						
(from school budget)	7,240	5,300	4,928	3,800	47%	39%
School Librarian / with Support Staff						
Weekly librarian hours	34.31	38.13	29.36	32.00	17%	19%
Weekly support staff hours	25.92	25.50	12.48	0.00	108%	
Information Resources						
Print volumes	10,856	12,069	8,876	9,439	22%	28%
Periodical subscriptions	22.76	22.00	21.20	20.00	7%	10%
CD-ROM reference titles	45.64	12.00	35.46	3.50	29%	243%
Total	**10,930**	**12,209**	**8,940**	**9,463**	**22%**	**29%**
Information Technology						
Library/networked computers	**52.50**	**41.50**	**10.82**	**6.00**	**385%**	**592%**
with licensed database access	38.94	25.50	5.76	0.00	576%	
with Internet access	25.84	5.00	10.06	4.00	157%	25%
with ACCESS PENNSYLVANIA	11.39	0.00	4.24	1.00	169%	-100%
Integrating Information Literacy						
Weekly hours spent						
Teaching cooperatively w/classroom teachers	2.73	1.00	1.96	0.75	39%	33%
Providing info instruction to individuals or groups	11.33	10.00	7.92	6.50	43%	54%
Providing in-service training to teachers	1.27	1.00	0.37	0.00	244%	
Serving on standards committee	0.57	0.25	0.50	0.50	14%	-50%
Serving on curriculum committee	0.95	0.25	0.28	0.00	237%	
Managing information technology	6.57	4.00	4.04	2.00	63%	100%
Total	**24.32**	**22.70**	**15.90**	**14.00**	**53%**	**62%**

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Table 13. Comparison of Highest and Lowest Scoring Schools on Key School Library Predictors of 8th Grade PSSA Reading Scores, 1998/99

8th Grade PSSA Reading Scores & Predictors	25 Highest Scoring Schools		25 Lowest Scoring Schools		Percent Difference (lowest to highest)	
	Mean	Median	Mean	Median	Mean	Median
PSSA Reading Scores (100 point scale)	88.93	88.75	73.50	74.38	21%	20%
Library Expenditures						
(from school budget)	14,506	14,450	8,386	7,100	73%	104%
School Librarian / with Support Staff						
Weekly librarian hours	38.40	40.00	37.63	37.50	2%	7%
Weekly support staff hours	30.30	35.00	15.80	0.00	92%	
Information Resources						
Print volumes	13,507	13,000	10,744	9,500	26%	37%
Periodical subscriptions	48.04	37.00	40.24	40.00	19%	-8%
CD-ROM reference titles	11.38	6.00	10.09	3.00	13%	100%
Total	**13,514**	**12,959**	**10,893**	**10,025**	**24%**	**29%**
Information Technology						
LIC/networked computers	**85.16**	**70.00**	**56.41**	**37.00**	**51%**	**89%**
with licensed database access	56.17	33.50	27.00	6.00	108%	458%
with Internet access	72.17	59.50	40.41	28.00	79%	113%
with ACCESS PENNSYLVANIA	33.44	9.50	41.65	6.00	-20%	58%
Integrating Information Literacy						
Weekly hours spent						
Teaching cooperatively w/classroom teachers	10.50	7.00	6.21	2.00	69%	250%
Providing info instruction to individuals or groups	10.35	8.00	10.20	8.00	1%	0%
Providing in-service training to teachers	1.09	1.00	0.84	0.00	30%	
Serving on standards committee	0.41	0.00	0.20	0.00	37%	
Serving on curriculum committee	0.79	0.00	0.20	0.00	295%	
Managing information technology	8.05	5.00	7.94	6.00	1%	-17%
Total	**34.56**	**26.00**	**27.07**	**21.00**	**28%**	**24%**

Table 14. Comparison of Highest and Lowest Scoring Schools on Key School Library Predictors of 11th Grade PSSA Reading Scores, 1998/99

11th Grade PSSA Reading Scores & Predictors	25 Highest Scoring Schools		25 Lowest Scoring Schools		Percent Difference (lowest to highest)	
	Mean	Median	Mean	Median	Mean	Median
PSSA Reading Scores (100 point scale)	86.75	86.25	74.73	75.00	16%	15%
School Library Expenditures						
(from school budget)	23,730	22.000	14,197	9,050	67%	143%
School Librarian / with Support Staff						
Weekly Librarian hours	45.06	40.00	43.25	40.00	4%	0%
Weekly support staff hours	49.57	40.00	19.28	17.50	157%	129%
Information Resources						
Print volumes	15,474	14,803	14,499	12,500	7%	18%
Periodical subscriptions	75.40	77.00	68.00	62.00	11%	24%
CD-ROM reference titles	9.90	4.50	8.87	4.00	12%	13%
Total	**17,082**	**16,095**	**14,861**	**13,308**	**15%**	**21%**
Information Technology						
Library/networked computers	**111.28**	**25.50**	**75.57**	**20.00**	**47%**	**28%**
with licensed database access	96.88	10.00	43.23	6.00	124%	67%
with Internet access	112.00	14.00	51.09	13.50	119%	4%
with ACCESS PENNSYLVANIA	94.35	10.00	53.86	8.00	75%	25%
Integrating Information Literacy						
Weekly hours spent						
Teaching cooperatively w/classroom teachers	10.26	4.50	7.55	5.00	36%	-10%
Providing info instruction to individuals or groups	13.89	10.00	12.26	10.00	13%	0%
Providing in-service training to teachers	2.20	0.50	0.55	0.00	300%	
Serving on standards committee	0.80	0.00	0.27	0.00	197%	
Serving on curriculum committee	0.36	0.00	0.25	0.00	46%	
Managing information technology	11.73	7.75	6.88	5.00	70%	55%
Total	**41.08**	**31.00**	**29.07**	**26.00**	**41%**	**19%**

Conclusions

Pennsylvania School Library Programs Can Make A Difference Supporting The Efforts Of Schools To Measure Up To Standards. Pennsylvania System of School Assessment (PSSA) reading scores increase with increases in the following characteristics of school library information programs: staffing, information technology, and integration of information literacy into the curriculum. In addition, as staffing, information resources, and information technology rise, school library staff spend more time teaching students and teachers how to access and use information resources. The relationship between staffing and test scores is not explained away by other school or community conditions. (See Figure 1, p. 9.)

Staffing

PSSA reading scores increase with increases in:
- school librarian staff hours; and
- support staff hours.

Information Technology

Where networked computers link school libraries with classrooms, labs, and other instructional sites, students earn higher PSSA reading test scores. These higher scores are particularly linked to the numbers of computers enabling teachers and students to utilize:
- the ACCESS PENNSYLVANIA database;
- licensed databases; and
- Internet/World Wide Web.

Integrating Information Literacy

Information Literate Students Know How To Use Information And Ideas Effectively.

The "keystone" finding of this study is the importance of an integrated approach to information literacy. For school library programs to be successful agents of academic achievement, information literacy must be an integral part of the school's approach to both standards and curriculum.

Test scores increase as school librarians spend more time:

- teaching cooperatively with teachers;
- teaching information literacy independently;
- providing in-service training to teachers;
- serving on standards committee;
- serving on curriculum committee; and
- managing information technology.

Indirect Effects

In addition to its direct effect on academic achievement, higher levels of school library program staffing—especially certified school librarians—predict:

- higher expenditures;
- larger and more varied collections of information resources;
- increased access to information technology for teachers and students; and
- more integrated approaches to information literacy, standards, and curriculum.

The more print and electronic information resources available through the school library, the greater amount of time spent by the school librarian on information literacy—that is, teaching students and teachers how to access and use such resources.

School and Community Differences

These predictors of academic achievement cannot be explained away by:

- school differences, including:
  - school expenditures per pupil;
  - teacher characteristics (education, experience, salaries);
  - teacher/pupil ratio; and
  - student characteristics (poverty, race/ethnicity), or
- community differences, such as:
  - adult educational attainment;
  - families in poverty; and
  - racial/ethnic demographics.

How Much Can Scores Rise With Good School Library Programs?

How much will a school's test scores improve with specific improvements in its library program? The answer depends on the school library program's current status, what it improves, and how much it is improved. When all school library predictors are maximized (e.g., staffing, library expenditures, information resources and technology, and information literacy activities of staff), PSSA reading scores tend to run 10 to 15 percent higher.

Recommendations for Action

The findings of this study recommend five specific actions by Pennsylvania school decision-makers:

- School library programs should have **funding for adequate professional and support staff, information resources, and information technology**. Such conditions are necessary if not sufficient alone to generate higher levels of academic achievement.

- **School librarians** must assert themselves as **leaders** in their schools. It is their responsibility to take the initiative required for **information literacy** to become an **integral part of the schools' approaches to both standards and curriculum**.

- Principals can do much to make this possible, including adopting **policies and practices** and communicating **expectations** that encourage **school librarians** to act as professional educators and **classroom teachers** to accept them as **colleagues**.

- The school library program cannot be limited to the library as a place. Just as school librarians must involve themselves in the design and delivery of instruction, **information technology** must be used to make information resources **available to teachers and students wherever they may be** in the school.

- While Internet access is important, the school librarian has an important role to play in ensuring that teachers and students have access to **high-quality licensed databases** (such as available through the POWER Library project) from which current, authoritative information may be obtained.